COMPMECH
Computational Mechanics & Advanced Materials

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SEMINARIO

Mathematical and numerical modeling of neurodegenerative diseases

Neurodegenerative diseases (NDs) are complex disorders primarily affecting neurons in the brain and nervous system, resulting in gradual deterioration and functional decline over time. A common hallmark across various NDs is the accumulation of disease-specific misfolded proteins in different brain regions (e.g., Aβ and tau in Alzheimer's disease, α-synuclein in Parkinson's disease). In this talk, we discuss the mathematical and numerical modeling of the progression of misfolded proteins in neurodegenerative diseases. We present suitable mathematical models, ranging in complexity, and discuss their numerical discretization. Numerical simulations are carried out within patient-specific brain geometries reconstructed from medical images. In the second part of the presentation, we focus on the mathematical modeling of waste removal mechanisms (clearance) from the brain, which is known to influence the onset and progression of NDs. We introduce and analyze the numerical approach, showcasing simulations within three-dimensional patient-specific geometries.

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10 aprile 2024, ore 16:30 (precise)
Aula MS1, DICAr